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## **Prescription Order Identification and Tracking System**

This application is a continuation in part of U.S. patent application serial number 09/715,439, filed on November 16, 2000, now pending,

### Field Of The Invention

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The present invention relates to a system for identifying prescription orders in a pharmacy system. In particular, it includes an automated position sensing device for detecting and identifying the location of a physical prescription order as it travels within a retail pharmacy and to remote locations such as remote filling stations.

### Background Of The Invention

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A typical local retail pharmacy fills thousands of prescription orders per week. Moreover, as the general population ages and new beneficial drugs are introduced, prescription order volumes to be filled at retail pharmacies are expected to double within the next few years. This present and expected increase in order volume places enormous pressure on pharmacists and other pharmacy workers, who strive to fill each order efficiently, accurately and quickly.

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Most customers have a limited view of how a typical retail pharmacy works. They often think that when they present a written prescription order to a local retail pharmacy, such as at their corner drugstore, a pharmacist will personally greet them, review their order, complete and file the necessary paperwork required by applicable laws, fill the prescription order, and present the filled order to the customer, all within a few minutes. However, in addition to increasing volume, the traditional retail pharmacist is now faced with a large variety of additional tasks, including obtaining proper insurance payment authorization, and in some cases verifying the refillability of a particular prescription order. Moreover, orders may now enter the pharmacy through a wide variety of mediums, such as via facsimile, phone call, and e-mail.

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In light of the increasing demands and obligations placed on retail pharmacies, they are evolving into more efficient organizations having numerous employees performing individual tasks associated with filling each prescription order. For example, when a customer presents a prescription to the pharmacy, a clerk may take the prescription order and enter it into a computer system that verifies insurance information. If approved, he or she may then prepare a prescription label to be placed on the package that will ultimately contain the prescribed drug. The clerk may then present the prescription order and label to a technician, usually stationed at another location within the pharmacy, who will physically fill the prescription by placing the appropriate quantity of the prescribed drug within the bottle and attach the label. Pursuant to applicable laws, a registered pharmacist then reviews the technician's work, and approves the dispersal of the completed prescription order to the customer. A clerk may then place the filled prescription in a storage area to await customer pick-up. Upon customer pick-up, the clerk files the written prescription order and any other appropriate paperwork related to the transaction, such as signed insurance forms and any informed consent paperwork. This type of system allows the pharmacy to quickly, efficiently, and economically fill numerous prescription orders.

In addition, a growing number of retail pharmacies are using remote filling stations to process some prescription orders. In general, the retail pharmacy receives an order from a customer, and completes the necessary steps to fill the prescription. However, instead of filling the prescription order in-house, the request is transferred, usually electronically, to a remote filling station, that fills the order and ships the filled order back to the pharmacy for distribution to the client. Usually, all the orders processed from a particular remote filling station are shipped to the retail pharmacy in one container, and considerable paperwork usually accompanies the container to document the filling of each prescription order. Accordingly, considerable pharmacy worker time and effort is spent processing the bulk shipment of filled prescriptions and related paperwork, such as entering information into the retail pharmacy's computer

system, and distributing the filled prescription orders to a storage area for individual customer pick-up.

Given the high volume of prescription orders being filled, the large number of people performing individual tasks associated with filling each prescription order, and the numerous locations within and outside of the pharmacy that a prescription order can be positioned as it is being filled, it is important that the prescription order, and ultimately the filled prescription, be easily located and identified throughout the process. For example, if a particular prescription order is denied payment by insurance, a clerk may hold the prescription order aside while the customer is contacted. If the customer presents himself to another clerk at the pick-up window, while the first clerk is attempting to call the customer at home, the second clerk often has no way of knowing the current status of the prescription order, or where it is in the order filling process. Accordingly, the second clerk is forced to search each location within the pharmacy.

In addition, should a prescription order be inadvertently misplaced within the pharmacy, it is often difficult to find, thereby needlessly delaying the filling process and wasting worker time to locate it. Similarly, it is desirable for pharmacy workers to be able to easily identify and locate particular prescription orders that meet predefined criteria, such as having fallen behind a promised customer pick-up time.

Some pharmacy vendors have attempted to overcome these problems by offering systems that manually track prescription orders within a pharmacy. In particular, they require the worker at a given station to manually enter into a computer the fact that they have received a particular prescription order at that particular location. However, in addition to the lost time associated with manually entering this information at each station, evidence suggest that many workers find this repetitive task cumbersome, and as a result, they often fail to manually enter such information. Accordingly, these types of tracking systems are rendered useless.

Similarly, some pharmacy vendors have attempted to automate the prescription filling aspect of a pharmacy by incorporating an automatic assembly line process for

filling prescription orders. In particular, an operator enters a prescription order into a computer system, which causes a conveyor-type system to deliver an empty vial to an automated drug dispenser. The filled vial is then automatically matched with a label and presented to a pharmacist for final review and approval. While these types of devices facilitate the quick and efficient filling of prescription orders, they are expensive for use in a retail pharmacy environment, and they occupy a large amount of limited space within the pharmacy. Moreover, they still require pharmacy workers to perform manual tasks such as verifying insurance and renewability of the prescription, and processing the various forms of prescription orders before and after they are entered into the automated system. Accordingly, they do not permit the easy location of prescription orders as they travel within the automated pharmacy environment, or easy identification of the prescription orders that have fallen behind a predetermined timeframe established for the pharmacy to fill the prescription order.

#### Summary Of The Invention

Despite the known pharmacy prescription order identification and tracking systems, there remains a need for a pharmacy prescription order identification system that allows a pharmacy worker to easily identify and distinguish a particular prescription order from a plurality of prescription orders within the pharmacy. In addition to other benefits that will become apparent in the following disclosure, the present invention fulfills these needs.

The present invention is a pharmacy prescription order identification system that includes a uniquely identified tag that travels with the prescription order throughout the pharmacy even to remote locations outside the pharmacy. The tag is uniquely coded such that a tag reader can simultaneously read a plurality of tags, thereby facilitating bulk processing and tracking of prescription orders.

The tag preferably includes read and writable memory therein such that key information about the prescription order, such as the customer's name, identifying information, prescribed drug, insurance information, directions for use, National Drug Control ("NDC") number, and the like can be encoded in the tag associated with each

prescription order. Accordingly, a pharmacy worker within the pharmacy or even at a remote location can quickly and easily determine all relevant information about a particular prescription order without necessarily having to first correlate a tag identification code with a computer system database.

5 Additional objects and advantages of the present invention will be apparent from the detailed description of the preferred embodiment thereof, which proceeds with reference to the accompanying drawings.

#### Brief Description Of The Drawings

Fig. 1 is a schematic diagram of an identification tag in accordance with an embodiment of the present invention having read-writable memory therein.

Fig. 2 is a schematic diagram of a retail pharmacy using a remote filling station to fill one or more prescription orders, and return the filled prescriptions to the retail pharmacy for distribution.

Fig. 3 is an isometric view of simultaneous scanning of a plurality of prescription orders in accordance with an embodiment of the present invention.

Fig. 4 is an isometric view of a prescription order having a tag operably secured thereto with the tag having a plurality of transducers thereon.

Fig. 5 is a schematic view of a prescription order tracking system in accordance with a preferred embodiment of the present invention.

Fig. 6 is a block diagram of an exemplar pharmacy prescription order filling system.

Fig. 7 is a block diagram of an exemplary computer system in accordance with a preferred embodiment of the present invention.

#### Detailed Description Of Preferred Embodiments

25 An economical and easy to use pharmacy prescription order identification and tracking system 10 that monitors and tracks prescription orders 12 through a pharmacy 14 and a related off-site facility 15 is shown in Figs. 1-7.

In general and as best shown in Figs. 1, 3, and 5, a prescription order 12 is presented to the pharmacy 14 and assigned an identification tag 16. Tag reading devices 18 are positioned at key locations throughout the pharmacy 14 and in communication with a computer system 20 having a display 22, such that the movement of the prescription order 12 throughout the pharmacy 14 automatically detects and records the location of the tag 16 without further worker input. A plurality of tags may be simultaneously tracked, thereby facilitating bulk processing of prescription orders, particularly those received from the off-site facility 15. Moreover, each tag includes read-writable memory that is preferably coded with key information about the prescription order, such as the customer's name, identifying information, prescribed drug, insurance information, directions for use, National Drug Control ("NDC") number, and the like. Accordingly, a pharmacy worker within the pharmacy or even at a remote location can quickly and easily determine all relevant information about a particular prescription order without necessarily having to first correlate a tag identification code with a computer system database.

In addition, a worker can easily determine the location of the prescription order 12 within the pharmacy by entering commands in the computer system 20 with a user input device such as a keyboard 120 to display the location of the prescription order 12 on the computer display 22. The individual elements forming the present invention are discussed in greater detail below.

A. Tags with read-writable memory

Preferably, the tags 16 can locate objects through electromagnetic interrogation of a spatial region to determine the presence of an object. One such system is disclosed in U.S. Pat. No. 6,057,756 to Engellenner, the disclosure of which is hereby incorporated by reference. In general, the tag 16 is an electromagnetic antenna and/or signal receiver which responds either passively or actively to announce the presence (or absence) of an object within a controlled region defined by a broadcasted electromagnetic interrogation signal. Preferably, each tag 16 includes a coding mechanism for uniquely identifying it with respect to other tags in the system.

Fig. 1 discloses an exemplar tag 16 and related components for locating a prescription order 12 in a pharmacy 14. The computer system 20 is operably connected to a transceiver 60a, such as for example, a conventional Radio-Frequency Identification ("RFID") tag, that transmits a signal 42 to a plurality of tags 16. Each tag 16 is assigned to travel with a unique prescription order 12, and includes a transceiver 60b for receiving the signal and internal circuitry such as a processor 48, power source 50 and memory 52 which contains a unique identifier for that tag and control logic to preferably activate one or more transducers 17, which serve as the worker signaling device when the tag 16 receiving a unique signal 42 from the transmitter 40.

Preferably, the transducer 17 are either a light 17a (Fig. 4) or audio speaker 17b (Fig. 4). More preferably, there are a plurality of transducers 17 that can be individually activated on each tag 16. For example, there can be three lights of different colors (i.e. red, yellow, and green), which can be activated either alone or in combination to identify the status of that prescription order 12. With a different status being denoted by a different transducer being activated.

More preferable, the memory 52 on the tag is read-writable that is preferably coded with key information about the prescription order, such as the customer's name, identifying information, prescribed drug, insurance information, directions for use, National Drug Control ("NDC") number, and the like.

The computer system 20 includes appropriate application programs 136 (Fig. 7) and memory 122 (Fig. 7) to correlate a customer's identifying information such as their name, phone number, and the like, with the unique identifier and/or other information in the memory of the tag traveling with that prescription order. Accordingly, when a pharmacy worker wishes to locate a customer's prescription order, her or she may find the customer's identifying information on the computer system 20, and cause the computer system to transmit the unique signal 42 through the transceiver 60a to wirelessly activate one or more transducers 17 on the tag 16

associated with the customer's prescription order 12. For example, the tag's audio speaker 17b may make an audible sound, or one or more lights 17a on the tag 16 may light and/or blink.

Preferably, a plurality of fixed or handheld transceivers, which are collectively referred to as tag readers 18 herein, are spaced apart from each other and positioned at desired locations within the pharmacy 14 to define spaced-apart interrogation zones within the pharmacy. Each tag reader 18 includes a front-end transmitter 62 that generates a digitally encoded signal 64. Preferably, the signal 64 is chosen to facilitate a response from only one uniquely coded tag 16. The receiver portion 66 of the tag reader 18 can induce a coded signal detector that senses the transponder signal 64 and correlates it with a stored code to identify that the tag 16 is present in a particular interrogation zone, thereby also determining the tag's location within the pharmacy.

The computer system 20 can also use conventional triangulation techniques to determine the location of the tag within the pharmacy. In which case, only two spaced-apart tag readers 18 need be placed within the pharmacy. Alternatively, using quasi-sonar-type locating techniques, a single tag reader 18 could be used determine the location of the tag within the pharmacy.

Each tag 16 can be either passive or active. In the passive mode, the tag circuitry accumulates and then returns a signal, if the interrogation signal matches a predefined code sequence stored in memory in the tag's circuitry. In an active mode, each tag further includes a power source 50 that assists with signal amplification, detection and/or wave forming.

#### B. Prescription Order Tracking Through Pharmacy

Tags 16 may also be used to track the location of the prescription order as it travels throughout the pharmacy 14 and an off-site facility 15. For example and referring to Fig. 5, a prescription order 12 is presented to the pharmacy 14 and assigned an identification tag 16 with one or more transducers 17 thereon. Tag readers 18 are positioned at key locations throughout the pharmacy 14 and in communication with the computer system 20 having a display 22, such that the movement of the



prescription order 12 throughout the pharmacy 14 automatically detects and records the location of the tag 16 without further worker input. Accordingly, a worker can easily determine the location of the prescription order 12 within the pharmacy by entering commands in the computer system 20 with a user input device such as a keyboard 120 to display the location of the prescription order 12 on the computer display 22.

Each tag reader 18 is placed in communication with the computer system such that information regarding the customer, his prescription order position, and the status of his order can be readily displayed on the computer display 22, and thereby facilitate location of the prescription order 10 within the pharmacy 14.

Preferably, the identification tags 16 are attached to the prescription label, detachably secured to the prescription order, or rigidly secured to a carrier 46 (Fig. 4) containing these documents and other materials related to filling the prescription. The tags themselves can be either rigidly or detachably secured to the prescription order. For example, the tags can be directly secured to the prescription with adhesive or secured within a prescription lid. Also, the tags can be secured to a fastener, such as a paperclip, that is detachably secured to the prescription order.

#### 1. Pharmacy Prescription Order Filling Procedure

Referring specifically to Fig. 6, an exemplary pharmacy, which is preferably a retail pharmacy, prescription order filling procedure is disclosed. In step P1, a prescription order, which could include a written prescription form, a renewable prescription label, or any other tangible medium documenting a request for a prescription by a health care provider is presented to the pharmacy either in person, via facsimile, via phone, or via a computer transmission, such as e-mail. A pharmacy worker then reviews the prescription order and attaches a unique tag 16 (Fig. 4) to it that is readable by a tag reader 18 (Fig. 4) to determine its location within the pharmacy 14.

As shown in Step P2, the pharmacy worker then determines if the prescription order is for a new prescription. If not, the worker determines if the prescription is

refillable (Step P5). If the prescription is not refillable, the pharmacy worker will typically contact the physician or the physician's office to determine if the prescription should be refilled (Step P6). If the physician denies a refill, the customer is informed (Step P12). If the physician does not answer the customer is notified and the  
5 pharmacy typically holds the prescription order until the physician calls back (Step P13).

If the pharmacy worker ultimately determines that the prescription order is fillable, by the answers to any of Steps P2, P5, or P6 being affirmative, the pharmacy worker then must typically determines if the prescription order is able to be sent to a  
10 remote filling facility or if it will be filled onsite within the pharmacy itself (Step P20).

A. Onsite Filling of Prescription Order

If the pharmacy worker determines that the prescription order is to be filled onsite, he or she first conducts an initial review (Step P3) which includes checking the available inventory for the prescribed drug (Step P4), determining if there is available  
15 insurance (Step P7) and if required, obtaining approval from the insurer and preparing the label and necessary billing and information disclosure paperwork (Step P8).

Regarding Step P4, if the inventory is not in stock, the pharmacy worker typically informs the customer and offers the customer an opportunity to special order the prescribed drug (Step P14). If there is only a partial amount of the prescribed drug  
20 in stock, the pharmacy worker will typically initiate a procedure for filling only a partial order (Step P15). This procedure typically includes preparing additional paperwork to alert the customer that only a partial order has been filled, and ordering additional quantities of the prescribed drug.

Regarding Step P7, if the insurance coverage is denied, the prescription order  
25 is typically held in an area pending the customer being contacted to request authorization to proceed (Step P16). If the insurer cannot be contacted, the pharmacy has the option to either fill the prescription and alert the customer upon pick-up, or hold the prescription order pending a response from the insurer (Step P17).

After the initial review is complete, the prescription order and related paperwork is presented to a technician for data entry (Step P8) and filling (Step P9), the technician fills the prescription order and attaches the label. The technician then presents the filled prescription order and related paperwork to a registered pharmacist for verification (Step P10).

Following verification, the filled prescription is placed in a storage area pending customer pick-up (Step P11).

B. Filling at Remote Filling Facility

If in Step P20, the pharmacy worker determines that the prescription order should be filled at an off site remote facility, the prescription order is transmitted to an off-site facility, usually electronically as shown in Fig. 2. In such case, the remote filling facility will attach a new tag to the prescription order, and if equipped with one, may code the tag's read-writable memory 52 (Fig. 1) with appropriate drug identifying and other information about the prescription order.

At the remote filing facility, the prescription order is filled in compliance with traditional filling practices, procedures and regulations, including conducting an initial review, checking insurance, labeling, data entry, filling, and verification (Step P21). The filled prescription order is then combined with other filled prescription orders to be delivered to the pharmacy and transported essentially in bulk to the pharmacy as shown in Fig. 2.

Upon arrival at the pharmacy, the bulk shipment of filled prescription orders are preferably positioned in bulk within an interrogation zone of the computer system (Step 22), which simultaneously reads the tag 16 on each prescription order in the bulk shipment as shown in Fig. 3, and updates the computer system's records with this information, including any new information added by the remote filling facility to the tag's memory 52 (Fig. 1). Each filled prescription is then placed in a storage area with prescription orders that were filled on-site pending customer pick-up (Step P11).

When a customer picks-up his or her filled prescription, the pharmacy worker complies with applicable customer notice requirements, and obtains the customer's

signature (also called "signature capture") confirming that they have received such notice (if applicable) and that they have received the filled prescription (Step P18).

## 2. Pharmacy Tracking Zones

In practice and referring specifically to Fig. 5, it is more efficient to perform the various steps noted above at spaced apart locations, or zones, throughout the pharmacy. For example, prescription order intake (Step P1 of Fig. 6) and initial review (Step P3 of Fig. 6) can be performed at location 21 (Fig. 5). Label printing and data entry (Step P8 of Fig. 5) could be accomplished at location 27 (Fig. 5). Prescription orders waiting from some form of call back either from the customer, the insurer, or the health care provider could be placed at location 27 (Fig. 5). Orders waiting to be filled could be placed at location 28 (Fig. 4), orders waiting pharmacist review and approval could be placed at location 23 (Fig. 4), and approved filled prescription orders could be stored at location 30 (Fig. 4). Obviously, additional zones (24 & 28) could be added to accommodate a particular pharmacy's practices and procedures.

Preferably each station includes a tag reader 18 in communication with the computer system 20 for automatically detecting the arrival of the tag 16 attached to the prescription order 12 as it enters each location. More preferably, the tag reader 18 detects both the arrival of the tag 16 in that station, and the departure of that tag 16 from that station, with the time interval at that station being determined and recorded therefrom.

Each tag reader 18 is preferably fixed at a particular location so that detecting the presence of a tag near the device also automatically indicates the location of that tag 16 within the pharmacy. The tag readers 18 can be rigidly mounted to a work area or station, or portable (i.e. handheld) devices that are operably connected to the station so that it can indicate a location within the pharmacy of a detected tag. Such portable devices facilitate scanning of prescription orders that are compiled in bulk, such as a container of filled prescriptions arriving from an off-site filing facility (Step P22, Fig. 6). Since each prescription order in the container has a unique tag 16 the tag reader 18

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### 3. Storage Bin

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### C. Computer System

Those skilled in the art will appreciate that an exemplary embodiment of the present invention relies on and incorporates several common features of modern personal computers. The general use, operation, and construction of a computer system is known and has been disclosed in numerous patents such as U.S. Pat. No. 5,818,447 to Wolf et al. and U.S. Pat. No. 5,752,025 to Shakib et al..

Referring to FIG. 6, the following discussion is intended to provide a brief, general description of a suitable computing environment in which the invention may be implemented. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules, being executed by a personal computer. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

With reference to FIG. 6, an exemplary system for implementing the invention includes a general purpose computing system in the form of a conventional personal computer 20, including a processing unit 121, a system memory 122, and a system bus 123 that couples various system components including the system memory to the processing unit 121. The system bus 123 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory includes read only memory (ROM) 124 and random access memory (RAM) 125. A basic input/output system 126

(BIOS), containing the basic routines that help to transfer information between elements within the personal computer 20, such as during start-up, is stored in ROM 124. The personal computer 20 further includes a hard disk drive 127 for reading from and writing to a hard disk, not shown, a magnetic disk drive 128 for reading from or writing to a removable magnetic disk 129, and an optical disk drive 130 for reading from or writing to a removable optical disk 131 such as a CD ROM or other optical media. The hard disk drive 127, magnetic disk drive 128, and optical disk drive 130 are connected to the system bus 123 by a hard disk drive interface 132, a magnetic disk drive interface 133, and an optical drive interface 134, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the personal computer 120. Although the exemplary environment described herein employs a hard disk, a removable magnetic disk 129 and a removable optical disk 131, it should be appreciated by those skilled in the art that other types of computer readable media which can store data that is accessible by a computer, such as magnetic cassettes, flash memory cards, digital video disk, Bernoulli cartridges, random access memories (RAMs), read only memories (ROM), and the like, may also be used in the exemplary operating environment.

A number of program modules may be stored on the hard disk, magnetic disk 129, optical disk 131, ROM 124 or RAM 125, including an operating system 135, one or more application programs 136, other program modules 137, and program data 138. A user may enter commands and information into the personal computer 20 through input devices such as a keyboard 140, pointing device 142, and tag readers 18. Preferably, a plurality of tag readers 18, which are distributed throughout the pharmacy are integrated with a switching device 36 that periodically monitors the status of each tag reader 18 and transmits that information to the personal computer 20. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like.

These and other input devices are often connected to the processing unit 121 through serial port interface 146 that is coupled to the system bus, but may be connected by other interfaces, such as a parallel port, game port or a universal serial bus (USB). A display 22 or other type of display device is also connected to the system bus 123 via an interface, such as a video adapter 148. In addition to the monitor, personal computers typically include other peripheral output devices (not shown), such as speakers and printers.

The personal computer 20 may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 149.

The remote computer 149 may be another personal computer, a server, a router, a network PC, a peer device, a personal digital assistant ("PDA"), or other common network node, and typically includes many or all of the elements described above relative to the personal computer 20, although only a memory storage device 150 has been illustrated in FIG.7. The logical connections depicted in FIG 7 include a local area network (LAN) 151 and a wide area network (WAN) 152. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

When used in a LAN networking environment, the personal computer 20 is connected to the local network 151 through a network interface or adapter 153. When used in a WAN networking environment, the personal computer 20 typically includes a modem 154 or other means for establishing communications over the wide area network 152, such as the Internet. The modem 154, which may be internal or external, is connected to the system bus 123 via the serial port interface 146. In a networked environment, program modules depicted relative to the personal computer 20, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.



Preferably, a plurality of networked personal computers 20 are positioned within the pharmacy, one at the intake area (21, Fig. 5), one at the customer pick-up area (29, Fig. 5), and one at the data entry/label area (27, Fig. 5).

5 In view of the wide variety of embodiments to which the principles of the invention can be applied, it should be apparent that the detailed embodiments are illustrative only and should not be taken as limiting the scope of the invention. Rather, the claimed invention includes all such modifications as may come within the scope of the following claims and equivalents thereto.

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